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Das Pflanzenreich.

Regni vegetabilis conspectus.

Im Auftrage der Königl. preuss. Akademie der Wissenschaften

herausgegeben von

A. Engler.

Heft 7.

IV. 12. Najadaceae

mit 71 Einzelbildern in 5 Figuren

von

A. B. Rendle.

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Najadaceae

von

A. B. Rendle.

(Gedruckt im October 1901.)

(*Najades* Juss. Gen. (1789) 18 ex parte. — *Najadeae* Endl. Gen. (1837) 229 ex parte. — *Najadaceae* trib. *Najadeae* Benth. et Hook. f. Gen. III. (1883) 1018. — *Najadaceae* Magnus in Engl. u. Prantl, Pflzfam. II. 1. (1889) 214.)

Wichtigste Litteratur. R. Brown, Prodr. (1810) 345. — Endlicher, Gen. (1837) 230. — Kunth, Enum. pl. III. (1841) 111. — Aschersoh, Fl. Prov. Brandenburg I. (1864) 669. — A. Braun, Revision of the genus *Najas*, in Journ. of Bot. II. (1864) 274; Über die von Charles Wright auf Kuba gesammelten Arten der Gattung *Najas*, in Sitzber. Ges. naturf. Fr. Berlin 1868. 17. — Magnus, Najadacearum italic. conspectus, in Giorn. bot. ital. II. (1870) 186; Najadaceae, in Engl. u. Prantl, Pflzfam. II. 1. (1889) 214. — Bentham et Hooker f., Gen. III. (1883) 1018. — Morong, The Najadaceae of North America, in Mem. Torrey Bot. Club III. 2. (1893) 57. — K. Schumann, in Fl. brasil. III. 3. (1894) 717. — A. B. Rendle, A systematic Revision of the genus *Najas*, in Trans. Linn. Soc. 2. Ser. V. (1899) 379 tt. 39—42; Supplementary notes, l. c. (1900) 437; The British species of *Najas*, in Journ. of Bot. XXXVIII. (1900) 105 t. 408.

Morphologie und Entwickelungsgeschichte: Magnus, Beitr. zur Kenntn. d. Gattung *Najas*, Berlin 1870; Über die Gattung *Najas*, in Ber. deutsch. bot. Ges. XII. (1894) 214. — Eichler, Blütendiagramme I. (1875) 80. — C. Bailey, On the structure of *N. graminea* Del. var. *Delilei* Magn., in Journ. of Bot. XXII. (1884) 305 tt. 249—252. — B. Jönsson, Om befruktn. hos slägtet *Najas*, in Lunds Univ. Årsskr. XX. (1883—1884). — K. Schumann, Morphol. Stud. (1892) 174. — Campbell, A morphological study of *Najas* and *Zannichellia*, in Proc. Calif. Acad. Sc. ser. 3. Bot. I. no. 1. (1897).

Character. Flores unisexuales, plantae monoecae rarius dioecae. Flos masculus monander, ante anthesin saepissime subsessilis et in spatha inclusus, monochlamydeus; perianthium apice bilabiatum ad antheram arcte applicitum; anthera terminalis saepissime subsessilis, quadrilocularis rarius unilocularis. Flos femineus nudus rarius spatha inclusus, ovarium ovale uniloculare; ovulum singulum basale erectum anatropum, integumentis duobus; stylus cylindricus, stigmatibus duobus vel tribus terminatus. Fructus in folii vagina sub medium inclusus, cum pericarpio tenui semini adhaerente. Semen durum, testa levis vel saepissime varie exsculpta; embryo rectus macropodus, valde evolutus, semini conformis, endospermium nullum.

Herbae annuae, aqua dulci vel subsalina submersae, e nodis radicantes; caules tenues elongati e folio paris inferiore ramosi, interdum, ut apparet, dichotome ramulosi, inermes vel rarius aculeati. Folia per paria approximata, sessilia, e vagina subbrevi anguste linearia, rarius latiora, sinuato-dentata vel serrulata, (dentes cum aculeo saepissime unicellulari luteo-brunneo terminati, saepe ad aculeum e margine protrusum reducti), uninervia, rarius in nervi dorso spinifera; vagina truncata vel rotundata vel superne in auriculas producta, margine plus minus spinifera; squamulae intravaginales binae minutae. Flores parvuli, virides vel rubro-tincti, e basi ramulorum orti et in foliorum vaginis solitarii vel pauci aggregati, nudi vel spatha circumdati.

Vegetative Organs (Vegetationsorgane). The plants vary from a few centimetres to 6 dm in height and show considerable variation in habit depending on the direction of the branches and the length and thickness of the internodes. The stem branches shortly above the base. The branches may be long and spreading or ascend from a decumbent base with a grass like growth, or may form a much-branched system in which each lateral axis grows as strongly as the main axis and gives rise to a dense apparently dichotomous

Fig. 1. *A—C, G Najas marina* L. *A* Habitus. *B* Flos ♀. *C* Fl. ♂ longit. sectus. *G* Fl. ♂, spatha perianthioque divulso. — *D—F N. minor* All. *D* Habitus. *E* Fl. ♀, *F* Fl. ♂ longit. sect. — *H N. flexilis* Rostkov. et Schm. Fl. ♀. (Sec. Magnus; e spatha, i perianthium).

growth (e. g. in *N. minor*). Frequently the elongated shoots end in a dense dichotomous growth.

The succulent internodes are often very brittle, as in the common species *N. marina*, they are generally unarmed but in some forms of *N. marina* are furnished with short spine-bearing teeth.

The leaves are apparently opposite; each pair however consists of an upper leaf which arises at a slightly higher level at the growing point and a lower one. Each pair forms an acute angle with preceding and succeeding pairs. A branch arises in the axil of the lower leaf only, starting from the second pair above the cotyledon. The lowest leaf on the branch is reduced to a small scale subtending a leaf-bud. The lowest developed leaf of the branch, namely the upper leaf of the lowest pair, in which no bud arises, forms together with the adjacent pair of leaves on the main axis an apparent whorl of three.

The sheath is well-developed and sharply distinguished from the lamina. The edges of the sheath of the lower leaf overlap the sheath of the upper leaf which is itself amplexicaul. The sheath may be truncate or have more or less sloping shoulders, or the shoulders may be drawn out into longer or shorter auricles. The upper margins and auricles are

generally furnished with small teeth or longer spine-bearing fimbriae; the tooth or fimbria always ends in a sharp yellowish-brown spine.

The form of the sheath is generally constant for individual species and often for larger groups. Sometimes as in *N. indica* it shows wide differences even on the same plant.

Inside the sheath at the base arises a pair of minute hyaline cellular scales; these are often subulate or filiform, but their shape is very variable even on the same plant. They occur in the cotyledon.

The lamina forms an obtuse angle with the sheath. It is generally narrow linear in outline tapering above, sometimes becoming filiform; it is rarely broader and linear-lanceolate as in some forms of *N. marina*. The margin varies considerably. In the broader-leaved forms of *N. marina* it is sinuate-dentate, the teeth often being longer than the leaf width, and ending in a strong yellow-brown spine with a base of several supporting cells. There is every gradation between this and the structure in *N. graminea*, where simple marginal cells protrude in the form of ascending yellow-brown translucent spines visible only under a lens, the leaf-margin appearing quite entire to the naked eye. In *N. marina* and several of its varieties, teeth similar to those on the internodes are found on the midrib on the back of the leaf. Similar dorsal spines occur in *N. lacerata*. As A. Braun indicated, the size and structure of the marginal teeth afford useful specific characters.

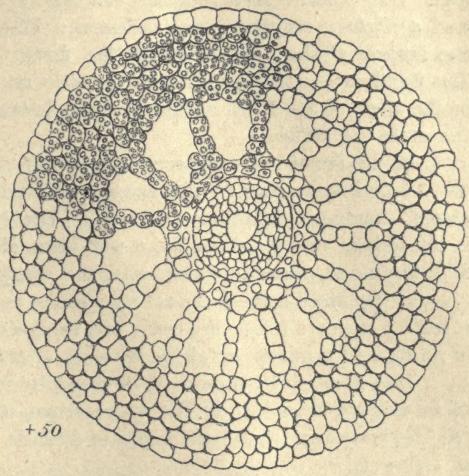

Fig. 2. *N. horrida* A. Br. Caulis transverse sectus. (Sec. Rendle).

Anatomy (Anatomische Verhältnisse). The internal structure of stem and leaf is very simple. The greatest differentiation occurs in *N. marina* where we find in the stem a definite small-celled epidermis, a many-layered parenchymatous cortex in which is a row of intercellular spaces, and a slender central cylinder. The stele is bounded by a layer which shows endodermoid thickenings on the radial walls, and consists of narrow closely packed thin-walled cells surrounding a central cavity. Just below the growing-point this cavity is occupied by thin elongated cells which doubtless represent tracheal elements. In the leaf of *N. marina* a definite epidermis surrounds a large-celled mesophyll consisting only of a single layer at the edges, becoming two-layered as we advance inward, and separated towards the middle line on each side by a large intercellular space. A slender stele similar to, but smaller than that of the stem runs up the middle line, and is surrounded by one or two layers of mesophyll-cells.

The remaining species forming the subgenus *Caulinia*, are even simpler in structure. In the stem an epidermis closely resembling the underlying cortical layer surrounds a cortex consisting generally of one or two outer layers, which is connected with an inner layer surrounding the stele by slender bands separating large intercellular spaces; the connecting bands are for the most part only one cell thick. In *Najas horrida* (Fig. 2) we find a more substantial cortex approaching that typical of *N. marina*. The leaves, which show some variation in structure, consist generally of two layers separated at a greater or less distance from the midrib by a larger or smaller intercellular space. Single cells, or groups of a few, in various positions may form thickened fibrous supporting cells; these may be constant for a given species or on the other hand variations may occur within its limits. The longitudinal intercellullar spaces in the leaf are interrupted by transverse septa to the strong development of which are due the horizontal lines running from the midrib towards the margin, which are characteristic of some species and occur on older leaves in others.

Floral Structure (Blütenverhältnisse). In the fertile shoots (Fig. 1 *A*, *D*) a ♂ or ♀ flower occupies the place of the lowest (scale-)leaf and its bud. The flower originates, as Magnus showed, by the dichotomy of an axillary branch. A protuberance arises at the growing-point in the axil of the lower leaf of each pair before the appearance of the upper leaf. This protuberance becomes divided by a vertical furrow into a slightly larger lower, and a slightly smaller upper rudiment. The former develops into a flower, the latter into the branch at the base of which the flower is apparently borne in the mature condition. The floral axis is therefore homologous to an axillary branch. Sporogenous tissue develops in the apex of the floral rudiment which becomes in the female the nucellus of the ovule, in the male the anther.

In the female an annular wall grows up round the developing ovule; its margin becomes 2—3-lobed according to the number of the stigmas, and when fully developed forms a closed chamber containing the ovule. The time and mode of origin of the outer envelope in *N. indica* and its allies have not been observed. The integuments of the ovule arise, first the inner, then the outer, after the ovary-wall has become partly developed.

In the male a symmetrical ring arises round the base of the anther, and subsequently a second appears inside the outer and remains always closely adherent to the anther. There is no sign of a midrib or of the division of either of these sac-like outgrowths into leaves.

This floral development is of great interest. (1) The flower arises by the dichotomy of an axillary branch. (2) The sporogenous tissue is produced in the tip of the floral axis. (3) The homology of the envelopes is difficult to explain in the ordinary terms of the parts of a flower.

In course of development the cup-like wall surrounding the ovule and the outer envelope of the anther are homologous, while the inner envelope which remains closely adherent to the anther corresponds with the integuments of the ovule. Magnus regards the carpel-like structure in the female flower as the homologue of the cup-like envelope round the group of carpels in the allied genus *Zannichellia*. The latter also arises as an annular outgrowth of the floral axis, but surrounds more than one rudiment each of which ultimately develops into an ovule surrounded by a stigma-bearing ovary-wall. Magnus suggests that the arrangement in *Najas* may have arisen from such a type by the suppression of all the ovules but one, and all the ovaries, leaving a naked ovule surrounded by a cup-shaped envelope (or perianth) which then developed stigmatic appendages. *Najas*, on this view becomes a gymnosperm, the female flowers of which have one, more rarely two, sac-like perianth envelopes corresponding with the two in the male.

This view has not been generally accepted. Campbell has shown that in *Zannichellia* we have a group of monocarpellary flowers, that is, an inflorescence. He also remarks on the primitive character of the flowers in *Najas* and it is in the primitive simplicity of the flower that we must seek the clue to the arrangement. We have in both male and female an axial structure containing sporogenous tissue which develops respectively into structures obviously comparable with a normal anther and nucellus, the latter becoming surrounded by integuments forming a normal ovule. The ovule is surrounded by a cup-like outgrowth, which recalls the development of the ovary in *Polygonum* or *Rumex* (see Payer, Traité d'Organogénie tt. 64, 65) and which has the appearance and form of an ovary. The inner envelope in the male flower I regard as a perianth. It is a lateral outgrowth of the floral axis below the androecium, which it protects, and has therefore the characters of a perianth which has arisen rather late in the history of the flower-development. The outer sac which characterizes the male, and is occasionally present in the female I have called a spathe (Fig. 1 *C*, *F*), remembering, however, that it is simply an outgrowth of the axis which ends in a flower, below that flower. It is comparable with the spathe so characteristic of submerged monocotyledonous water-plants, which may have, moreover, a very similar appearance (e. g. *Lagarosiphon*, *Hydrilla* etc.). It will then correspond, as Magnus suggested, with the cup-like envelope in *Zannichellia*, which on Campbell's interpretation becomes a spathe surrounding an inflorescence, as in the Aroids.

Najas graminea is exceptional in having no spathe around the male flower (Fig. 5 *S*). The adult flowers generally stand singly in the fertile sheath-axil, more rarely several together, a fertile shoot with suppressed internodes standing in the axil. They are generally 2 to 3 mm long. The ♂ consists of a sessile or subsessile anther closely surrounded by a thin membranous perianth ending above the anther in two thickened lips (Fig. 1 *C*). The anther is ellipsoidal or oblong in shape, has a delicate wall of two cell-layers, and is generally 4- more rarely 1-locular. The cells are crowded with pollen-grains, oval or roundish in shape, both sometimes occurring in one anther, as in *N. graminea*; the grain has a single delicate uncuticularized wall, more or less filled with dark cell-contents consisting largely of starch-granules. In *N. graminea* the perianth forms two large ear-shaped lips above the anther.

The membranous spathe conforms to the outline of the flower but is prolonged above it into a cylindrical neck which ends in a few of the characteristic spine-cells (Fig. 1 *C*, *F*). A very short peduncle may be developed below the spathe; in *N. podostemon* it is almost as long as the flower. Before dehiscence of the anther the flower-stalk elongates pushing the anther, still closely enveloped by the perianth, through the spathe which becomes split, sometimes laterally, sometimes from the apex downwards. The lips of the perianth separate and the anther dehisces apically.

The female flowers (Fig. 1 *B*) are generally naked, consisting of a somewhat ellipsoidal ovary bearing a narrow style which divides into 2, more rarely 3, equal or unequal, linear-tapering stigmas. In some American species non-stigmatic spine-bearing appendages also occur. Thus in *N. flexilis* a pair of spine-arms alternates with the stigmas (Fig. 1 *H*). *N. microdon* shows great variety in the number of stigmas and spine-arms, the occurrence of transitional structures indicating that the latter are merely barren stigmas.

In a few tropical old-world species the female flower is enveloped in a spathe closely resembling that of the male.

Pollination (Befruchtung). As the flowers are always submerged pollination must be effected by passive falling of the pollen, or by the transport of the pollen by currents of water or by aquatic animals. There is no evidence of the last-named. Magnus has observed the grains in *N. marina* to germinate before leaving the anther, the wall growing out into a long pollen-tube. Jönsson suggests that as the male flowers in monoecious forms stand higher on the shoot than the female which are mature at the same time, the pollen grains fall, weighted by their starch-contents, on to the stigmas beneath. This is quite possible especially as the spathe frequently splits laterally the anther being extruded on a curved pedicel.

Fruit and Seed (Frucht und Same). The fruit is narrowly ellipsoidal or oblong, enveloped, where this occurs, in the persistent spathe, and bearing the remains of style and stigmas. In fresh specimens of *N. marina* and *N. graminea* the pericarp was succulent, when dry the wall becomes thin and membranous generally clinging so closely to the seed as to take the impressions of the pitting on the testa. The seed has a conspicuous raphe. The testa is hard and brittle. In *N. marina* (Fig. 3 *J*—*Q*) it has many layers of cells with hard thick pitted walls, surrounded on the outside by a row of very large cells with thin walls and clear contents the side walls having a delicate reticulate thickening. The outer cells ultimately perish and the testa consists of a stone-parenchyma, the surface of which is rugulose with irregular polygonal pittings. Its thickness varies in the different forms and varieties. In the other species there are only three layers. The cells of the innermost are thickened and flattened, those of the middle layer are more nearly isodiametric with very thick hard much pitted walls, while those of the outer show three forms of development. In *N. flexilis* and *N. tenuissima* they are thickwalled and the seed-coat is smooth and polished. In the commonest type (*N. minor*, *N. graminea* etc.) the cells of the outer layer are large, clear, and thin-walled with a delicate spiral thickening on the side-walls. The cells vary in shape in different species giving the characteristic areolation to the testa. In

a third type (e. g. *N. microdon*) the outer and side-walls of the outer layer are not thickened, but collapse, while the inner wall becomes thickened and with its concave surface forms the shallow pits, rows of which give a characteristic marking to the coat.

The straight embryo fills the testa. It consists of a large hypocotyl and radicle, a well-developed lateral plumule and a blunt terminal cotyledon.

Geographical Distribution (Geographische Verbreitung). *Najas* is almost world-wide occurring in all zones except the frigid. It is still unrecorded for certain areas in which it might be expected to occur, such as Tasmania and New Zealand. The genus consists of a few widely distributed and a number of apparently more or less local species. *N. marina*, a polymorphic species, comprising the subgenus *Eunajas*, occurs over almost the whole area of the genus but finds its chief development in the north temperate zone of the Old World. The subgenus *Caulinia* has no such widely distributed species. *N. minor* ranges from the south of Europe and the Mediterranean area to tropical Africa and eastwards to India, North Asia and Japan; it has a variety in Scandinavia. *N. graminea* is an Old World tropical and subtropical species. *N. flexilis* is temperate North American and North West European; *N. microdon* replaces it in the warmer parts of America. The remaining species have all restricted areas and fall for the most part into small geographical groups, namely an Asiatic, Australian, Mascarene, African, and West Indian and tropical South American.

Systematic Relations (Verwandtschaftliche Beziehungen). *Najas* forms a distinct and apparently primitive type of Monocotyledon. Its place is undoubtedly in the *Helobiae* series of which it has the characteristic large macropodous embryo. Its nearest ally is *Zannichellia* which resembles it in the axial stamen and the female inflorescence; the latter is quite comparable but contains several flowers within the spathe. In general vegetative structure *Najas* strongly resembles several submerged genera of *Hydrocharitеae* (*Lagarosiphon*, *Hydrilla* and *Elodea*) with slender branching stems, crowded narrow sessile leaves and an often finely toothed leaf-margin, the flowers being also enveloped by a tubular or sac-like spathe but showing much higher differentiation.

Fossils (Fossile Reste). Heer has described 3 species from tertiary strata namely *N. effugita* and *stylosa* from Oeningen and *N. striata* from Spitzbergen. The determinations are however extremely doubtful. Undoubted fruits of typical *N. marina* have been found in various neolithic, interglacial, and preglacial deposits by C. Reid proving the species to have been formerly widely distributed over the Southern portion of England (Fig. 3 *L*). Fruits are also reported from similar deposits in Scandinavia (G. Andersson) and central Europe (C. A. Weber). Fruits of *N. flexilis* have been recorded from North Germany and Scandinavia indicating that this species was formerly more widely spread than at present in northern Europe. *N. minor* (Fig. 4 *T*) is only known from Britain in fossil fruits found by Reid in Sussex (pleistocene) and Norfolk (Cromer forest bed, preglacial). In the Sussex locality was also found a single seed of *N. graminea* (Fig. 5 *U*), a tropical and subtropical old-world species which has been introduced into North Italy and to one locality in the north of England.

Genus unicum.

Najas L.

Najas [L. Gen. ed. 1. (1737) 278] L. Spec. pl. ed. 1. (1753) 1015; Endl. Gen. (1837) n. 1656; Benth. et Hook. f. Gen. III. (1883) 1018; Magnus in Engl. u. Prantl, Pflzfam. II. 1. (1889) 217. — *Cavolinia* Raf. in Amer. Monthly Magaz. (1818) 175. — *Cavoliana* Raf. in Journ. de phys. LXXXIX. (1819) 259. — *Caulinia* Willd. in Mém. Acad. Berlin 1798 (1801) 87. — *Fluvialis* [J. Bauhin, Hist. pl. III. (1651) 779] Adans. Fam. II. (1763) 472; Pers. Synops. II. (1807) 530. — *Fucus* Tourn. Inst. Herb. I. (1700) 569; Mappus, Hist.

pl. Alsat. (1742) 113. — *Hyas* Dumort. Anal. fam. (1829) 61. — *Ittnera* C. C. Gmel. Fl. badens. III. (1808) 590.

Clavis subgenerum.

A. Dioeca; testa e stratis cellularum induratarum pluribus (plusquam tribus) constructa. Plantae saepius robustiores cum epidermide caulis foliorumque distincto, et cortice melius evoluto; internodiis et dorso foliorum saepe armatis . Subgenus I. **Eunajas** Aschers.

B. Monoeca; testa e stratis cellularum induratarum tribus constructa. Plantae saepe graciliores cum epidermide a cortice minus evoluto vix differente, internodiis et dorso foliorum inermibus . . . . . Subgenus II. **Caulinia** (Willd.) Aschers.

Subgenus I. **Eunajas** Aschers. Fl. Prov. Brandenburg I. (1864) 669.

1. **N. marina** L. Spec. pl. ed. 1. (1753) 1015; Hornem. Fl. dan. (1834) t. 2121; Morong in Mem. Torrey Bot. Club III. 2. (1893) 58. t. 65; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 389 t. 39 figg. 1—30, et ib. (1900) 437. — *N. major* Allion. Fl. pedem. II. (1785) 221; Schnizl. Iconogr. I. (1843—1846) t. 71; Nees, Gen. pl. Fl. germ. III. (1845) 44, 45. — *N. fluviatilis* Poir. in Lam. Encycl. IV. (1795—1796) 416. — *N. fluvialis* Thuillier, Fl. Paris ed. 2. (1799) 510. — *N. muricata* Thuillier l. c. 509. — *N. monosperma* et *N. tetrasperma* Willd. Spec. pl. IV. (1805) 331. — *N. fucoides* Griff. Notul. III. (1851) 182 t. 251. — *N. latior* Muell. ex K. Schum. in Fl. brasil. III. 3. (1894) 804. — *N. polonica* Zalewski in Kosmos XXI. (1896) 326. — *Ittnera najas* C. C. Gmel. Fl. badens. III. (1808) 590 t. 3. — *I. major* Reichb. Fl. germ. excurs. (1830) 150. — *Sclerocarpus obliquus* C. A. Weber in Neu. Jahrb. Mineral. II. (1891) 79. — Ad 7 dm alta, fragilis, late ramosa; folia rigida, linearia ad oblongo-linearia, 1,5—3,5 cm longa, dentibus marginalibus validis patentibus; vagina late rotundata, inermis vel denticulis paucis instructa. Flos ♂ 3—4 mm longus, spatha lageniformi circumdatus, anthera quadrilocularis; fl. ♀ nudus, stigmata 2, rarius 3. Fructus ellipsoideus 4—8 mm longus; testa rugulosa, areolis plurangulis notata (Fig. 1 *A—C, G*; Fig. 3 *A—Q*).

Typus in formis tribus occurrit:

a. Forma luxurians internodiis elongatis, saepius inermibus; foliis linearibus vel super vaginam angustatis, 3—4 cm longis, 2—4 mm latis, cum dentibus marginalibus (utrinque 7—9) saepius laminae latitudinem haud aequantibus; fructu 5—6 mm longo. (*N. fluvialis* Thuillier; *N. major* var. *laevis* DC. Fl. franç. ed. 3. II. (1805) 587).

b. Forma europaea communis, internodiis sparse armatis; foliis saepius 1,5—2 cm longis, interdum 2,5 cm, dentibus marginalibus quam in (a) majoribus; fructu ellipsoideo vel ovoideo-ellipsoideo 4—5 mm longo, saepius 2,5 mm lato.

c. Forma cum foliis grosse-dentatis (saepius circa 2 cm longis), et fructu majore, 5—7,5 mm longo, et 2,5—3,5 mm lato.

Der Typus ist weit verbreitet; forma (a) ist von Central- und Südeuropa, Japan und Westaustralien bekannt; forma (b) ist allgemein in Europa verbreitet: ich habe sie gesehen von Ostengland, Frankreich, Deutschland, Schweiz, Ungarn, Russland, Italien, außerdem von Indien, China, Nordamerika, Jamaika, Nord- und Westaustralien; forma (c) findet sich in Frankreich und Deutschland, ist häufig in der Schweiz und in Norditalien, man kennt sie auch von Südrussland, Kashmir, Central- und Nordasien, Nordamerika (Arizona) und Cuba.

Var. *α.* **denticulata** Rendle in Trans. Linn. Soc. 2. Ser. V. (1900) 438. — Sublaxa, nternodiis elongatis sparsissime et breviter spinosis; folia linearia, denticulis laminae latitudinem certe duplo brevioribus, dorso sparse et breviter spinifero.

Central-Asien: Semipalatinsk, Ajaguz-Fluss (Korshinsky).

Var. *β.* **Zollingeri** Rendle in Trans. Linn. Soc. 2. Ser. V. (1900) 438. — Luxurians, internodiis inermibus; folia linearia, plana, subacuta, margine denticulis frequentibus instructo, dorso inermi. Fructus 4 mm long., 1,6 mm lat.

Malayischer Archipel: Bali-Insel (Zollinger n. 3891).

Var. γ. **recurvata** Dudley, Cayuga Fl. (1886) 104; Rendle l. c. (1899) 393 t. 39 figg. 9, 26. — Internodia plus minus spinosa; folii dentes marginales laminae latitudinem aequantes vel excedentes. Fructus 4—5 mm long., 1,5—2 mm lat. (Fig. 3 *A*).

Vereinigte Staaten von Nordamerika.

Var. δ. **Ehrenbergii** A. Br. in Journ. of Bot. II. (1864) 275; Rendle l. c. 394 t. 39 figg. 10, 27. — Folia linearia, margine dentibus numerosis laminae latitudinem haud aequantibus instructo. Fructus minor 3 mm long., vix 2 mm lat. (Fig. 3 *B*, *N*).

Arabien. Tunis. Socotra (Balfour n. 732; Schweinfurth n. 709).

Var. ε. **Riedelii** K. Schum. in Fl. brasil. III. 3. (1894) 725; Rendle l. c. — Caules laxi paene inermes; folia linearia, dentibus marginalibus patentibus numerosis, spinis in dorso pluribus; vaginae dentes prominentes 1—2.

Brasilien: Lago de Pertininga (Riedel).

Var. ζ. **angustifolia** A. Br. in Journ. of Bot. II. (1864) 275; Rendle l. c. 395 t. 39 figg. 13, 28. — Laxa, internodiis saepius inermibus; folia 2—4 cm longa, anguste linearia, dentibus brevibus dissitis in utroque margine 5—10. Fructus 4—4,5 mm long., 1,5—2 mm lat. (Fig. 3 *E*, *O*).

Häufig im Baltischen Gebiet, außerdem bekannt von Assyrien, Casp. Meer, Turkestan, Ost-Indien, Bourbon, Hawaii-Inseln, West-Australien.

Var. η. **intermedia** (Gorski) A. Br. in Journ. of Bot. II. (1864) 276; Rendle l. c. figg. 14, 29. — ?*N. maritima* Pall. Reise I. (1791) 369. — *N. intermedia* Gorski in Eichw. Naturhist. Skizze von Lithauen (1830) 126. — Internodia inermia vel sparse spinosa; folia parva, 1,2—2 cm longa, anguste linearia, cum dentibus laminae latitudinem saepius excedentibus in utroque margine 4—7. Fructus saepius 3—4 mm, interdum 5 mm longus, 1,5—2,5 mm latus. (Fig. 3 *F*, *P*).

Häufig im Baltischen Gebiet und in Nord-Deutschland, sie kommt außerdem vor in Österreich (Klagenfurt), Schweiz, Russland, Sicilien, Casp. Meer, Afghanistan, Ostindien.

Var. ϑ. **microcarpa** A. Br. in Journ. of Bot. II. (1864) 276; Rendle l. c. 396. — var. *Bollei* K. Schum. in Fl. brasil. III. 3. (1894) 725. — Minor, breviter ramosa; folia anguste linearia, 1—1,9 cm longa, dentibus in utroque margine 5—7, saepius laminae latitudinem haud aequantibus. Semen saturate rubro-brunneum, 2—5 mm longum, 1,5 mm latum.

Gran Canaria.

Var. ι. **brachycarpa** Trautv. in Bull. Soc. natural. Moscou XL. 3. (1867) 97; Rendle l. c. (1900) 439. — Caules inermes; folia brevia, linearia, obtusa, 5—16 mm longa, dentibus in utroque margine 3—8, circa $^1/_4$ laminae latitudinis aequantibus; vagina lata. Fructus late ellipsoideus 2,5 mm longus.

Central-Asien: Alakul-See, Songarei.

Var. κ. **brevifolia** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 396. — Ramosa internodiis spinosis elongatis; folia brevia 1—1,5 cm, rarius 2 cm longa, grosse-dentata. Fructus ellipsoideus 4—4,5 mm longus.

Deutschland: Schlon-See bei Heringsdorf (Herb. Braun).

Var. λ. **latifolia** A. Br. ex K. Schum. in Fl. brasil. III. 3. (1894) 725; Rendle l. c. 396 t. 39 fig. 11. — *N. latifolia* A. Br. in Journ. of Bot. II. (1864) 276. — Robusta internodiis inermibus; folia late linearia vel lineari-lanceolata, margine cum dentibus numerosis parvis, dorso linea prominula 5—7-spinosa instructo (Fig. 3 *C*).

Venezuela: Bei Caracas.

Var. μ. **grosse-dentata** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 396 t. 39 fig. 16. — Dense ramulosa, internodia paene inermia; folia brevia 7—10 mm longa, irregulariter grosse-dentata; vagina magna subtruncate rotundata.

China: Kianang-Gebiet (Staunton).

Var. ν. **muricata** (Del.) A. Br. ex K. Schum. in Fl. brasil. III. 3. (1894) 725 non Hartmann; Rendle l. c. 397 t. 39 fig. 12, ib. 440. — *N. muricata* Del. Fl. Egypt. (1812) 281 t. 50 fig. 1. — *Caulinia muricata* Spreng. Syst. I. (1825) 20. — Internodia dense muricata; folia linearia, dense grosse-dentata, dorso spinosa. Semen 3,5 mm longum (Fig. 3 *D*).

Sicilien. Algier. Ägypten. Ceylon. Trop. Ost-Afrika: Albert Nyansa (Stuhlmann n. 2841). Australien.

Var. ξ. **gracilis** Morong in Bot. Gaz. X. (1885) 225; Rendle l. c. 397; — var. *angustissima* K. Schum. in Fl. brasil. l. c. — Gracilis internodiis elongatis, saepius inermibus; folia anguste linearia, 2,5—4 cm longa, in utroque margine dentibus 8—12 laminae latitudinem aequantibus vel excedentibus instructa. Semen oblongum 3,5 mm longum.

Florida (Curtiss n. 2705).

Var. *o.* **californica** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 398 t. 39 fig. 15. — Brevis, ramosa, internodiis sparsissime spinosis; folia linearia, superne angustata, dentibus

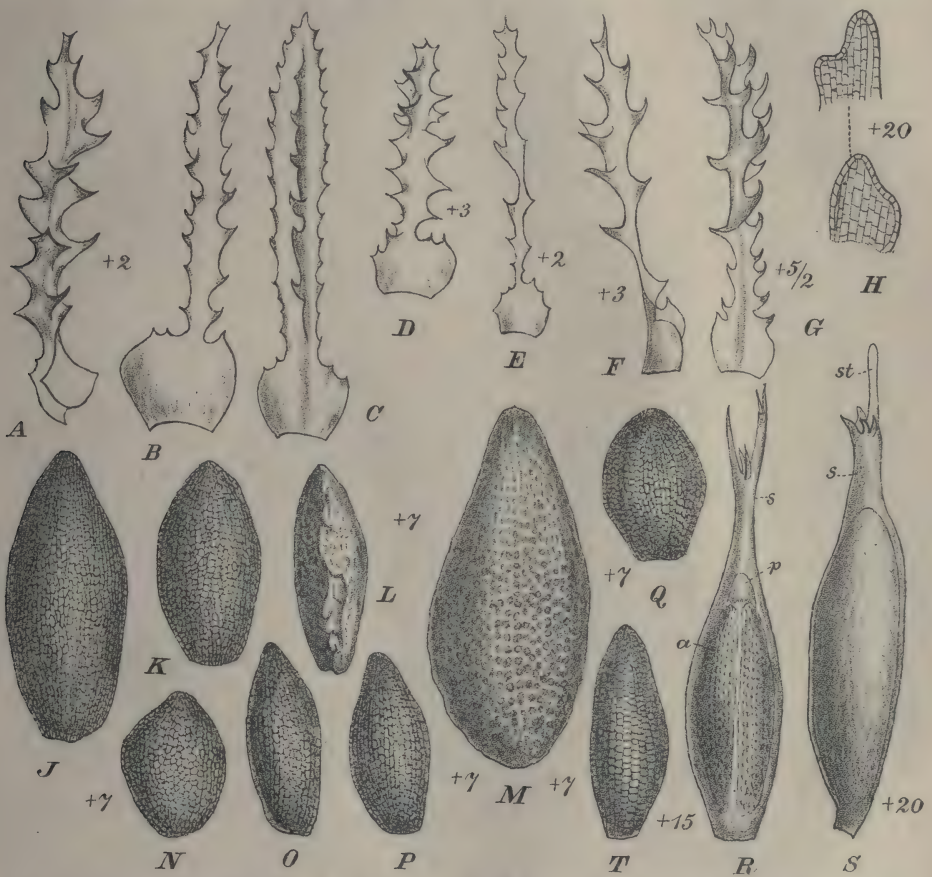

Fig. 3. *A—Q N. marina* L. *A—G* Folia varr. *recurvatae*, *Ehrenbergii*, *latifoliae*, *muricatae*, *angustifoliae*, *intermediae*, *californicae*. *H* Squamulae intravaginales. *J* Semen formae *α*. *K* S. formae *β*. *L* S. fossile britannicum. *M* S. formae *γ*. *N* S. var. *Ehrenbergii*. *O* S. var. *angustifoliae*. *P* S. var. *intermediae*. *Q* S. var. *mexicanae*. — *R—T N. indica* (Willd.) Cham. *R* Fl. ♂. *S* Fl. ♀. *T* Semen. (Sec. Rendle; *s* spatha, *p* perianthium, *a* anthera, *st* stigma).

marginalibus (utrinque 6—11) laminae latitudinem excedentibus vel haud aequantibus, spinis dorsalibus (4—6) saepe in nervo mediano prominente continuis (Fig. 3 *G*).

Californien (Coulter n. 188, Orcutt).

Var. *π.* **mexicana** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 398 t. 39 fig. 30. — Atroviridis internodiis muricatis, folia lata (1,3—1,6 cm longa, 3—3,75 mm lata) curvata, irregulariter grosse-dentata; vagina lata. Semen subovoideum, 3 mm longum, 2 mm latum (Fig. 3 *Q*).

Mexico: Muleje (Palmer n. 20).

Subgenus II. **Caulinia** (Willd.) Aschers. Fl. Prov. Brandenburg I. (1864) 670.

Clavis sectionum.

A. Flores utriusque sexus spatha circumdati . . . . . Sectio I. **Spathaceae** Rendle
B. Flos ♂ spatha circumdatus, ♀ nudus.
  a. Vaginae declives . . . . . Sectio II. **Americanae** Magnus
  b. Vaginae truncatae vel auriculatae . . . . . Sectio III. **Euvaginatae** Magnus
C. Flores utriusque sexus nudi . . . . . Sectio IV. **Nudae** Rendle

Sectio I. **Spathaceae** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 398.

Clavis specierum.

A. Semen rectum.
  a. Dentes folii marginales laminae latitudinem aequantes vel longiores . . . . . 2. *N. indica.*
  b. Dentes folii marginales circa dimidium laminae latitudinis aequantes . . . . . .
    α. Vaginae breviter auriculatae . . . . . 3. *N. Schweinfurthii.*
    β. Vaginae truncatae vel rotundatae . . . . . 4. *N. Welwitschii.*
  c. Dentes folii marginales circa quartam partem laminae latitudinis aequantes; vaginae fimbriatae . . . . . 5. *N. affinis.*
  d. Denticuli folii marginales pauci et parvi . . . . . 6. *N. madagascariensis.*
B. Semen curvatum . . . . . 7. *N. ancistrocarpa.*

2. **N. indica** (Willd.) Cham. in Linnaea IV. (1829) 501 (synon. exclus.); Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 399 t. 39 figg. 31—45. — *N. minor* var. *indica* A. Br. in Journ. of Bot. II. (1864) 278 pro parte. — *N. tenuis* A. Br. ex Magnus, Beitr. (1870) p. VII. — *Fluvialis indica* Pers. Synops. II. (1807) 530. — *Caulinia indica* Willd. in Mém. Acad. Berlin 1798 (1801) 89 t. 1 fig. 3. — Laxa; caules tenuissimi saepe filiformes; folia angustissime linearia saepe setacea, 2—3 cm longa, dentibus marginalibus utrinque 10—17; vagina angusta, auriculata vel subtruncata vel late rotundata, dentata. Semen ellipsoideum 2 mm longum, areolis minutis numerosis, in seriebus 25—30, lineatum (Fig. 3 *R—T*).

Ostindien: Bengalen, Tranquebar (Klein im Herb. Willdenow n. 17092).

3. **N. Schweinfurthii** Magnus in Ber. deutsch. bot. Ges. XII. (1894) 220; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 400 t. 40 figg. 64—67. — Parva; caules filiformes, ramuli ultimi dense foliati; folia lineari-angustata, graciliter subrecurvata, 1,4—2,1 cm longa, dentibus marginalibus circa 12; vagina cylindrica, auriculis irregulariter spinosis; anthera unilocularis. Fructus incogn. (Fig. 4 *C*).

Central-Afrika: Gebiet der Djur, Grosse Seriba Ghattas (Schweinfurth n. 2140 z. T.).

4. **N. Welwitschii** Rendle in Catal. Afr. Pl. Welwitsch II. (1899) 95 et in Trans. Linn. Soc. 2. Ser. V. (1899) 401 t. 39 figg. 46—52, t. 40 figg. 53, 54. — Effusa; folia lineari-angustata 2—2,5 cm longa, dentibus marginalibus utrinque 12—16; vagina denticulis numerosis superne marginata. Semen ellipsoideo-oblongum, 2,5 mm longum, areolis quadratis in seriebus circa 25 lineatum (Fig. 4 *B*).

Angola: Barra do Bengo (Welwitsch n. 247), Barra do Dande (Welwitsch n. 247b).

5. **N. affinis** Rendle in Trans. Linn. Soc. 2. Ser. V. (1900) 440. — Caules tenues, ramuli ultimi congesti, dense foliati; folia recurvata, linearia, dentibus marginalibus regularibus utrinque 12—18; vagina late rotundata; spatha ♀ limbis geminis linearibus unispiniferis terminata. Fructus ignot.

West-Afrika: Senegal (Leprieur, Herb. Cosson in Paris).

6. **N. madagascariensis** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 402 t. 40 figg. 55—63, et ib. (1900) 441. — Laxissima; folia angustissima vel filiformia ad 4,5 cm longa; vagina oblique vel vix auriculata, vel rotundata, sparse denticulata. Semen anguste

ellipsoideum 2,5—3 mm longum, areolis subquadratis vel sexangularibus in seriebus circa 25 regulariter lineatum (Fig. 4 *A*).

Madagascar (Hildebrandt n. 4027; Baron nn. 3339, 3419). — Mauritius: am Mohastrom. — Bourbon.

7. **N. ancistrocarpa** A. Br. ex Magnus Beitr. (1870) p. VII. et 24 t. 3 figg. 1—5; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 403. — Dichotome ramosa; folia recurvata,

Fig. 4. *A N. madagascariensis* Rendle. Fl. ♀. — *B N. Welwitschii* Rendle. Semen. — *C N. Schweinfurthii* Magnus. Fl. ♂, anth. dehiscente. — *D—E N. Wrightiana* A. Br. *D* Folii vagina. *E* Semen. — *F—H N. conferta* A. Br. *F* Folium. *G* Semen. *H* Sculptura sem. valde aucta. — *J—L N. microdon* A. Br. *J* Folii vagina. *K* Folii margo valde auctus. *L* Fructus. — *M—N N. flexilis* Rostkov. et Schm. *M* Fl. ♂, anth. dehiscente. *N* Semen. — *O—P N. punctata* (A. Br.) Rendle. *O* Folii margo, valde auctus. *P* Fl. ♀. — *Q—R N. arguta* H. B. K. *Q* Folium. *R* Folii dens marginalis, valde auctus. — *S—T N. minor* All. *S* Semen. *T* S. fossile britannicum. — *U N. Kurziana* Rendle. — *V N. brevistyla* Rendle. — *W N. foveolata* A. Br. (Sec. Rendle; *pe* pedicellus, *pr* process. spinifer).

1,5—2 cm longa, iis *N. minoris* similia sed minus robusta et angustiora; vagina truncata vel rotundata. Semen parvum tenue, falcatum, longitudinaliter striatum.

Japan: Yokohama (Wichura n. 813 z. T.).

Sectio II. **Americanae** Magn. in Engl. u. Prantl, Pflzfam. II. 1. (1889) 217.

Clavis specierum.

A. Anthera unilocularis.
  a. Semen politum . . . . . 8. *N. flexilis.*
  b. Semen exsculptum . . . . . 9. *N. podostemon.*

B. Anthera quadrilocularis.
  a. Denticuli folii marginales minuti oculo nudo haud manifeste conspicui . . . . . 10. *N. microdon.*
  b. Denticuli folii marginales oculo nudo manifeste conspicui.
    α. Folia plusquam 1 mm lata.
      I. Caules rigidi, folia rigidula punctata . . . . . 11. *N. punctata.*
      II. Caules graciles, folia laxe recurvata haud punctata . . 12. *N. arguta.*
    β. Folia minus quam 1 mm lata.
      I. Semen ellipsoideum, 1 mm longum.
        1. Testa cum seriebus areolarum circa 10 . . . . . 13. *N. microcarpa.*
        2. Testa cum seriebus areolarum circa 20 . . . . . 14. *N. Wrightiana.*
      II. Semen elongatum, 2 mm longum. . . . . 15. *N. conferta.*

8. **N. flexilis** (Willd.) Rostkovius et Schmidt, Fl. sedin. (1824) 382; Morong in Mem. Torrey Bot. Cl. III. 2. (1893) 59 t. 66; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 403 t. 40 figg. 92—98 et ib. (1900) 441. — *N. canadensis* Michx. Fl. bor.-amer. II. (1803) 220. — *Caulinia flexilis* Willd. in Mém. Acad. Berlin 1798 (1801) 89 t. 1 fig. 1. — *Fluvialis flexilis* Pers. Synops. II. (1807) 530. — Gracilis, ramis erectis vel ascendentibus apice saepe plumosis; folia anguste linearia, 1—2,5 cm longa, margine spinulis minutis numerosis instructo; stigmata gemina cum processubus spiniferis sterilibus decussata. Fructus 2,5—3 mm longus (Fig. 1 *H*, Fig. 4 *M—N*).

Der Typus in N.-W.-Europa (Irland, Schottland, Apland, Finland, Nord-Deutschland, Litthauen) und Nord-Amerika (Canada und nördliche Vereinigte Staaten).

Var. *α.* **microcarpa** Nilsson in Bot. Notis. (1881) 147; Rendle l. c. 404. — Planta brunneo-viridis, fructu minore 2—2,25 mm longo.

Schweden.

Var. *β.* **robusta** Morong in Bot. Gaz. X. (1885) 255; Rendle l. c. 404 et 441. — Robusta, folia lineari-angustata, 1,5—2 mm lata.

Verein. Staaten von Nord-Amerika: Michigan, Massachusetts, Texas.

9. **N. podostemon** Magnus, Beitr. (1870) p. VII. t. 3 fig. 15, t. 5 figg. 16, 17; K. Schum. in Fl. brasil. III. 3. (1894) 730 t. 123 fig. 3; Rendle l. c. 405. — Effusa, caulibus gracillimis, rhombeo-dichotome ramosis; folia anguste linearia, 7—14 mm longa, manifeste serrata, dentibus cum cellulis pluribus marginem superantibus. Flos ♂ pedicellatus; stigmata 2—3, processus steriles 0. Fructus subfusiformis 1,1—1,5 mm; semen graciliter tesselatum.

Brasilien: Gebiet Alto Amazonas, Rio Maranhão.

10. **N. microdon** A. Br. in Sitzber. Ges. naturf. Fr. Berlin (1868) 17 cum var. *guadalupense*; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 405 t. 40 figg. 78—91, et ib. (1900) 441. — *N. flexilis* Griseb. Veget. Karaib. (1857) 110 non Rostk. et Schm. — *N. flexilis* var. *guadalupensis* A. Br. in Journ. of Bot. II. (1864) 276, var. *fusiformis* Chapm. Fl. South. U. S. (1860) 444. — *N. guadalupensis* Morong in Mem. Torrey Bot. Club III. 2. (1893) 60 t. 67; K. Schum. in Fl. brasil. III. 3. (1894) 726 t. 124 fig. 1. — *Caulinia guadalupensis* Spreng. Syst. I. (1825) 20. — Debilis, diffuse ramosa, internodiis tenuibus; folia patentia interdum flexuosa, linearia, 1—2,5 cm longa, margine spinulis minutis numerosis instructo; stigmata 2, processubus spiniferis binis superadditis, interdum stigmata 3. Semen anguste ellipsoideum, circa 2 mm longum, areolis subquadratis in seriebus 15—18 manifeste exsculptum (Fig. 4 *J—L*).

Der Typus in den Vereinigten Staaten südlich von Nebraska; Central-Amerika, Westindien, Süd-Amerika, Venezuela, Französisch-Guiana, Uruguay, Argentina.

Var. *α.* **curassavica** A. Br. in Sitzber. Ges. naturf. Fr. Berlin (1868) 17, extensa; Rendle l. c. 407. — *N. flexilis* varr. *curassavica* et *Gollmeriana* A. Br. in Journ. of Bot. II. (1864) 277. — Planta robustior, suberecta, minus et rarius diffuse ramosa; folia latiora, 1,2—2,7 cm longa, 1—1,75 mm lata.

Florida, Mexico, Westindien (Porto Rico, Cuba), Venezuela.

11. **N. punctata** (A. Br.) Rendle in Journ. Linn. Soc. 2. Ser. V. (1899) 407 t. 40 figg. 99—102. — *N. flexilis* var. *punctata* A. Br. in Journ. of Bot. II. (1864) 277. — Caules rigidi, ramis brevibus; folia rigidula, punctata, late linearia, circa 1,8 cm longa, spinis marginalibus utrinque circa 35, cum cellulis binis elevatis; vagina valida in laminam transiens. Stigmata 2, processu spinifero interdum superaddito. Fructus incognitus (Fig. 4 *O—P*).

Venezuela: Caracas, Udora Valencia (Gollmer).

12. **N. arguta** H. B. et K. Nov. gen. et spec. I. (1815) 371; Magnus, Beitr. (1870) p. VI. t. 3 figg. 19—22; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 410 t. 40 figg. 103, 104, et ib. (1900) 442. — *N. arguta* var. *tenera* A. Br. in Journ. of Bot. II. (1864) 277. — *N. tenera* Schrad. in Gött. gelehrt. Anzeig. II. (1821) 715. — *Caulinia tenella* Nees in Neuwied, Reise Brasil. II. (1824) 345. — Dichotome ramosa, ramulis ultimis plumosis condensatis; folia latiuscule linearia, obtusa, circa 2 cm longa, margine denticulis frequentibus regulariter minuto. Stigmata 2, processus spiniferi 2—3. Semen elongato-fusiforme, 2,5 mm longum, seriebus areolarum elongatarum plurimis exsculptum (Fig. 4 *Q—R*).

Tropisches Süd-Amerika: Columbia, Mompox, am Magdalena-Fluss (H. B. et K.); La Paila (Holton); Ecuador, Guayaquil-Fluss (Jameson n. 544); Brasilien, Amazonen-Strom (Spruce n. 1622), Ilheos (Martius).

13. **N. microcarpa** K. Schum. in Fl. brasil. III. 3. (1894) 727. — Ramuli rhombeo-dichotomi; folia anguste linearia vix 5 mm lata, denticuli subrepandi, in utroque margine 7—10, cum cellulis pluribus elevati; vagina subciliata. Stigmata 2, processubus spiniferis 1 vel 2, rarius 3, superadditis. Semen late ellipsoideum.

Paraguay (Weddell n. 2374 z. T. und n. 3289).

14. **N. Wrightiana** A. Br. in Sitzber. Ges. naturf. Fr. Berlin (1868) 17; K. Schum. in Fl. brasil. III. 3. (1894) t. 123 fig. 1 (sub *N. conferta*); Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 408 t. 40 figg. 68—74. — *N. flexilis* Griseb. Catal. pl. cubens. (1866) 218 non Rostk. et Schm. — Erecta, ramis vel ramulis brevibus dense foliatis; folia anguste linearia, leviter recurvata, 1,2—2,2 cm longa, denticuli circa dimidium laminae latitudinis aequantes, in utroque margine 15—20. Flores ♀ aggregati; stigmata 2, semen areolis subquadratis in seriebus circa 20 lineatum (Fig. 4 *D—E*).

Der Typus in Westindien (Cuba) und Brasilien (Pernambuco, Schenck n. 4161).

Var. *α.* **laxa** A. Br. in Sitzber. Ges. naturf. Fr. Berlin (1868) 17; Rendle l. c. 409. — Debilis et laxa; folia quam in typo latiora, dentibus marginalibus ascendentibus et minus prominulis.

Cuba.

15. **N. conferta** A. Br. in Sitzber. Ges. naturf. Fr. Berlin (1868) 17; K. Schum. in Fl. brasil. III. 3. (1894) 728 (pro parte); Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 409 t. 40 figg. 75—77. — *N. arguta* var. *conferta* A. Br. in Journ. of Bot. II. (1864) 277. — Planta minor confertim ramosa et dense foliata; folia anguste linearia, 1,2—1,7 cm longa, dentibus in utroque margine 8—10, laminae latitudinem excedentibus. Semen anguste ellipsoideo-oblongum seriebus areolarum angustarum numerosis obscurius lineatum (Fig. 4 *F—H*).

Cuba (Wright nn. 75, 3715). — Französ. Guiana (Leprieur). — Brasilien (Max von Neuwied; Weddell n. 2374 z. T.).

Sectio III. **Euvaginatae** Magnus in Engl. u. Prantl, Pflzfam. II. 1. (1889) 218.

Clavis specierum.

A. Anthera unilocularis.
  a. Testae areolae latiores quam longae . . . . . 16. *N. minor.*
  b. Testae areolae isodiametricae . . . . . 17. *N. Kurziana.*
  c. Testae areolae longiores quam latae.
    α. Vagina rotundata vix auriculata . . . . . 18. *N. tenuissima.*
    β. Vagina breviter et late auriculata . . . . . 19. *N. gracillima.*

B. Anthera (qua cognita est) quadrilocularis.
  a. Species asiaticae.
    α. Vagina magna, marginibus late imbricatis . . . . . 20. *N. Kingii.*
    β. Vagina plus minus cylindrica.
      I. Spatha apice lacerata . . . . . 21. *N. lacerata.*
      II. Spatha apice haud lacerata.
        1. Semen plus quam 2 mm longum . . . . . 22. *N. foveolata.*
        2. Semen circa 2 mm longum . . . . . 23. *N. falciculata.*
        3. Semen 1 mm longum . . . . . 24. *N. brevistyla.*
  b. Species australienses.
    α. Denticuli folii marginales minuti.
      I. Vagina longe auriculata . . . . . 25. *N. tenuifolia.*
      II. Vagina breviter auriculata . . . . . 26. *N. Browniana.*
    β. Denticuli folii prominuli . . . . . 27. *N. Leichhardtii.*
  c. Species mascarenae.
    α. Folia anguste-linearia . . . . . 28. *N. australis.*
    β. Folia setacea . . . . . 29. *N. setacea.*
  d. Species africanae.
    α. Folia falcata, dentes laminae latitudinem excedentes . . . 30. *N. horrida.*
    β. Folia haud falcata, dentes laminae latitudinem haud excedentes . . . . . 31. *N. interrupta.*

16. **N. minor** Allione, Fl. pedem. II. (1785) 221; Nees, Gen. pl. Fl. germ. III. (1858) t. 44 figg. 22—24; Magnus, Beitr. (1870) t. 1, 2 etc.; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 410 t. 41 figg. 105—115; et ib. (1900) 442; et in Journ. of Bot. XXXVIII. (1900) 107 t. 408; — var. *intermedia* Cesati, Compend. Fl. ital. (1867) 204. — *N. marina* L. Fl. suec. ed. 2. (1755) 345 pro parte (i. e. synon. e Micheli). — *N. subulata* Thuillier, Fl. Paris ed. 2. (1799) 510. — *N. fragilis* Del. in Descr. Egypt. Hist. nat. II. (1813) 175. — *N. dichotoma* Roxb. Hort. bengal. (1814) 71 et Fl. ind. III. (1832) 749. — *N. heteromorpha* Griff. ex Voigt, Hort. suburb. calcutt. (1845) 694. — ?*N. ternata* Roxb. ex Griff. Notul. III. (1851) 183 et Icon. pl. asiat. (1851) t. 252. — *N. alagnensis* Paglia in Att. Soc. ital. Sci. nat. X. (1867) 399, non Pollin. — *Caulinia fragilis* Willd. in Mém. Acad. Berlin 1798 (1801) 88 t. 1 fig. 2 et Spec. pl. IV. (1805) 182; Nees, l. c. t. 45 figg. 1—11. — *C. minor* Coss. et Germ. Fl. Paris (1845) 575. — *Fluvialis minor* Pers. Synops. II. (1807) 530. — *Ittnera minor* C. C. Gmel. Fl. badens. III. (1808) 592 t. 4. — Fragilis, 4—25 cm alta, valde et saepe dichotome ramosa; folia linearia, superne angustata, recurvata, 1—2 cm longa, cum dentibus in utroque margine 6—10 patentibus, e basi lata spiniferis, laminae latitudinem rarius aequantibus; in plantis laxioribus folia ad 2,5 cm, haud recurvata, dentibus 12—15 utrinque instructa; vagina truncata, rotundata. Semen 2—3 mm longum, oblique lineari-oblongum, seriebus 12—18 scalariformibus exsculptum (Fig. 4 *S—T*, Fig. 1 *D—F*).

Der Typus in Central- und Süd-Europa (nur fossile in England); Mediterran-Gebiet: Algerien, Tunis, Egypten, Kleinasien, Syrien; Asien: Kurdistan, Persien, Afghanistan, Indien, Vorderindien, Mandschurei, Japan; Trop. Afrika: Emin Pascha Reise (Schweinfurth n. 4242).

Var. *α.* **spinosa** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 413. — Folia anguste linearia margine et dorso valde dentata, dentes marginales laminae latitudinem subaequantes, vel vix breviores. Semen 1,5—1,75 mm longum.

Ost-Indien (Wight n. 2793).

17. **N. Kurziana** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 413 t. 41 figg. 116—121. — Parva, caulis gracillima; folia tenuia, c. 15 mm longa, utrinque denticulis minutis numerosis instructa; vagina breviter auriculata. Semen ellipsoideo-oblongum, 1 mm longum, conspicue areolatum, seriebus areolarum quadratarum circa 16 (Fig. 4 *U*).

Ost-Indien: Nord-Bengalen zwischen Kishenganj und Oolabena (Kurz).

18. **N. tenuissima** A. Br. ex Magnus, Beitr. (1870) 24, 45, t. 5 figg. 13, 14; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 414. — *N. minor* var. *tenuissima* A. Br. in Journ. of Bot. II. (1864) 277. — Laxissima, folia tenuissima, circa 12 mm longa, dentibus in utroque margine circa 8 vix protrusis. Semen anguste ellipsoideum, 2,5 mm longum, areolis elongatis quadrangulis lineatum.

Finnland: Wesijärvi-See Tavastland-Gebiet (Norrlin), nahe Borga (Saelan).

19. **N. gracillima** (A. Br.) Magnus, Beitr. (1870) 23; Morong in Mem. Torrey Bot. Club III. 2. (1893) 61 t. 68; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 414 t. 41 figg. 122—125. — *N. indica* var. *gracillima* A. Br. ex Engelm. in A. Gray, Man. Bot. ed. 5. (1868) 681. — Caules filiformes, folia angustissime linearia, 2—2,5 cm longa, margine inferne integro, superne denticulis spiniferis vix prominulis distantibus instructo. Semen linearioblongum, 2,5—3 mm longum, areolis in series numerosas ordinatis et duplo longioribus quam latis (Fig. 5 *D*).

Östliche Vereinigte Staaten.

20. **N. Kingii** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 415 t. 41 figg. 126—131, ib. (1900) 442. — Caules elongati, effusi, apice dense ramulosi; folia lineari-angustata, 3,5 cm longa, dentibus in utroque margine 16—19, obtuse triangulis, laminae latitudinis dimidium aequantibus vel brevioribus. Semen ellipsoideum 0,75—2 mm longum, areolis parvis subsexangulis, in seriebus circa 30 (Fig. 5 *A—C*).

Süd-Andamanen (King); Singapore; Tonkin (Balansa n. 4651).

21. **N. lacerata** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 416 t. 41 figg. 132—138. — Rigidula, dichotome ramulosa; folia linearia ad 2,5 cm longa, dorso carina dentata instructa, dentibus in utroque margine circa 12, laminae latitudinis dimidium aequantibus vel minoribus; vaginae auriculae grosse-dentatae. Fructus ignotus (Fig. 5 *E—F*).

Ost-Indien: Tinnevelly (Beddome n. 8202); Madras (Wight); ?Bengal (Clarke n. 4366, ohne Blüt.).

22. **N. foveolata** A. Br. ex Magnus, Beitr. (1870) p. VII.; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 416 t. 41 figg. 139—144 et ib. (1900) 443. — *N. indica* Zoll. Syst. Verzeichn. Heft 1 u. 2 (1854) 74 non Cham. — Caules elongati patentes, folia linearia superne valde angustata vel setacea, 1,5—3,5 cm longa, in utroque margine denticulis parvis subtriangulis aculeatis 6—20 instructa; vagina breviter auriculata. Semen 2,25—2,5 mm longum, areolis distinctis, in medio seminis subquadratis, in seriebus circa 20 (Fig. 4 *W*).

Der Typus findet sich in Ost-Indien (Clarke n. 31879, Hooker f. n. 639 u. s. w.); Sumbawa (Zollinger n. 3398); Timor; Philippinen; Molukken; Japan: Yokoska (Savatier n. 1348).

Var. *α.* **minor** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 417. — Folii denticuli quam in typo minus conspicui, $^1/_3$—$^1/_4$ laminae latitudinis aequantes. Semen 1,5 mm longum, manifeste areolatum, areolis subquadratis vel multangulis, in seriebus 14.

Ost-Indien: Kaktee Tank bei Belgaum.

23. **N. falciculata** A. Br. in Journ. of Bot. II. (1864) 278; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 417 t. 42 figg. 145—151. — Caules graciles elongati erecti, ramis brevibus ascendentibus; folia anguste linearia, 1,6—2 cm longa, cum denticulis in utroque margine 18—25, $^1/_3$—$^1/_4$ laminae latitudinis aequantibus; vaginae auriculae saepe falcatae.

Semen ellipsoideo-oblongum, circa 2 mm longum, areolis quadratis minutis, in seriebus circa 30.

Ost-Indien: Madras (Wight). — Java (Horsfield). — Manila (Martens).

Nota. Species dubia; specimina plura desiderata.

24. **N. brevistyla** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 418 t. 42 figg. 152—157. — Caules tenues elongati, ramulis brevibus dense foliatis; folia rigidula 1—2 cm

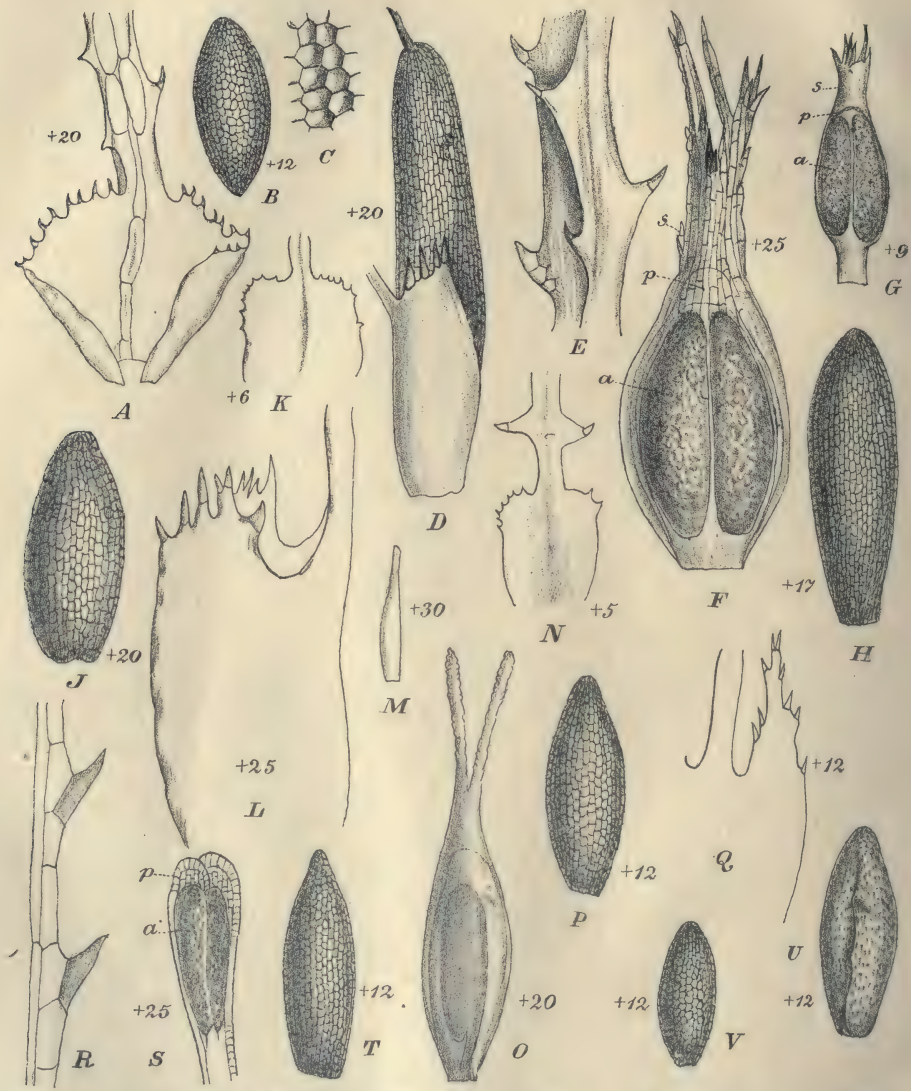

Fig. 5. *A—C N. Kingii* Rendle. *A* Folii basis. *B* Semen. *C* Sem. sculpt., valde aucta. — *D N. gracillima* (A. Br.) Magnus. Folii vagina cum fructu. — *E—F N. lacerata* Rendle. *E* Laminae pars dentes dorsales exhibens. *F* Fl. ♂. — *G—H N. tenuifolia* R. Br. *G* Fl. ♂. *H* Sem. — *J N. Browniana* Rendle. Sem. — *K N. australis* Bory. Folii vaginae pars superior. — *L—M N. setacea* (A. Br.) Rendle. *L* Folii vagina a latere visa. *M* Squamula intravaginalis. — *N—P N. horrida* A. Br. *N* Folii basis. *O* Fl. ♀. *P* Semen. — *Q—V N. graminea* Del. *Q* Folii vaginae pars, auricula. *R* Folii marginis pars e specimine philippinensi. *S* Fl. ♂. *T* Semen. *U* S. fossile britannicum. *V* Sem. var. *angustifoliae*. (Sec. Rendle).

longa, cum denticulis e basi lata spiniferis utrinque 10—22, laminae latitudinis dimidium aequantibus; vagina saepius breviter auriculata. Stylus brevis. Semen 1 mm longum, areolis subquadratis in seriebus circa 20 (Fig. 4 *V*).

Ost-Indien: Calcutta. — Hinter-Indien: Assam.

25. **N. tenuifolia** R. Br. Prodr. (1810) 345; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 419 t. 42 figg. 158—162 et ib. (1900) 443. — *N. graminea* var. *tenuifolia* A. Br. in Journ. of Bot. II. (1864) 278. — Caules erecti vel basi repentes, ramis saepe brevioribus ascendentibus vel interdum elongatis et laxius foliatis; folia flexuosa, 2,5—3,5 cm longa, in utroque margine cum denticulis vix prominulis 18—20. Semen oblongum vel ellipsoideo-oblongum, 2,3 mm longum, regulariter areolatum, areolis quadratis minutis, in seriebus circa 30 (Fig. 5 *G—H*).

Australien: Nord-Australien, Queensland und New South Wales. — Neu-Caledonien.

26. **N. Browniana** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 420, t. 42 figg. 163—167. — Caules debiles, ramosissimi, 15 cm longi, folia filiformia cum spinulis in utroque margine 10—15. Semen ellipsoideum, 1,5 mm longum, areolis quadratis in seriebus circa 25 subirregulariter lineatum (Fig. 5 *J*).

Nord-Australien: Cavern-Insel, Carpentaria-Bucht (R. Brown).

27. **N. Leichhardtii** Magnus, Beitr. (1870) 46, t. 8 figg. 1—8; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 420, t. 42 figg. 168—171. — Folia flexuosa, cum denticulis in utroque margine 10—17 saepe laminae latitudinem aequantibus; vagina valde auriculata. Fructus ignotus.

Australien (Leichhardt).

28. **N. australis** Bory ex Chamisso in Linnaea IV. (1829) 501; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 421 t. 42 figg. 172—176. — *N. minor* var. *indica* A. Br. in Journ. of Bot. II. (1864) 278 pro parte. — *Caulinia alternifolia* Willd. ex Cham. l. c. — Laxissima, graminea, ramis elongatis ad 50 cm; folia sicca flexuosa, cum denticulis in utroque margine 12—18, breviter triangulis; vagina superne late rotundata et denticulis numerosis instructa. Semen anguste ellipsoideum, 2,7 mm longum, areolis quadratis minutis in seriebus circa 25 regulariter lineatum (Fig. 5 *K*).

Mauritius. — Bourbon. — Madagascar (Baron n. 2629; Humblot n. 351).

29. **N. setacea** (A. Br.) Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 422 t. 42 figg. 177—182, ib. (1900) 443. — *N. minor* var. *setacea* A. Br. in Journ. of Bot. II. (1864) 278. — Debilis caulibus filiformibus; folia 1,4—1,7 cm longa, cum spinulis vix prominulis in utroque margine 20—30; vagina late auriculata, auriculis paucidentatis. Semen oblongum 1,5—1,7 mm longum, areolis quadratis minutis, in seriebus circa 30, subdistincte lineatum (Fig. 5 *M*).

Mauritius (Mougeot; Néraud).

30. **N. horrida** A. Br. ex Magnus, Beitr. (1870) p. VII, 46, 47; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 422 t. 42 figg. 183—191, ib. (1900) 443. — *N. pectinata* Magnus in Aschers. et Schweinf. Illustr. Fl. Egypte (1889) 145 et in Ber. deutsch. bot. Ges. XII. (1894) 219. — *Caulinia pectinata* Parl. Fl. ital. III. (1858) 665. — Caules saepe robusti elongati effusi, ramis dense fructicoso-ramulosis; folia 0,8—2 cm longa, crassiuscula, saepe rigida, cum dentibus validis 4—8 utrinque armata; vagina lata, truncate-rotundata. Semen oblongo-ellipsoideum, 2—2,5 mm longum, areolis subquadratis in seriebus circa 20 distincte lineatum (Figg. 2, et 5 *N—P*).

Algerien: La Calle, Rivisteau au lac Houbera (Durieu). — Central-Afrika: Gazelle-Fluss (Schweinfurth n. 1137 und 1228 z. T.); Fazogl (St. Ange). — Tropisches Ost-Afrika: Tanganyika-See (Hore), Mozambique (Schlechter n. 11883). — West-Afrika: Nupe (Barter n. 1065), Kamerun (Preuss n. 452, Staudt n. 488), Senegal (Roger; Leprieur).

31. **N. interrupta** K. Schum. in Engl. Pflanzenwelt Ost-Afr. C (1895) 94; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 423. — Caules graciles rigiduli; folia circa 1 cm longa, irregulariter paucidentata (dentes utrinque 5—6); vagina saepius asymmetrica, latissime

rotundata vel truncata. Semen fusiforme, 2 mm longum, areolis quadratis in seriebus circa 20 manifeste exsculptum.

Tropisches Ost-Afrika (Fischer n. 614). — Süd-Afrika (Bolus n. 6283).

Sectio IV. **Nudae** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 424.

32. **N. graminea** Del. Fl. Egypte (1812) 282 t. 50 fig. 3; C. Bailey in Journ. of Bot. XXII. (1884) t. 250; Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 424 t. 42 figg. 192—201, et ib. (1900) 443. — Var. *Delilei* Magnus in Ber. deutsch. bot. Ges. I. (1883) 522; Bailey l. c. 305 t. 249. — *N. alagnensis* Pollini, Fl. veron. III. (1824) 49. — *N. seminuda* Griff. in Voigt, Hort. suburb. calcutt. (1845) 694 et Icon. pl. asiat. (1851) tt. 251 fig. 2, 253, 254. — *N. valisnerioides* Griff. Notul. III. (1851) 180. — *N. tenuifolia* Aschers. in Att. Soc. ital. sci. nat. X. (1867) non. R. Br. — *N. serristipula* Maxim. in Bull. Acad. St. Pétersbourg XII. (1868) 72. — *Caulinia alagnensis* Pollini, Hort. et Prov. veron. pl. (1816) 26, et Fl. veron. III. (1824) 49. — *C. intermedia* Balbis in Mem. Accad. Sci. Torino XXIII. (1818) 105 (nomen); et in Nocca et Balbis, Fl. ticin. II. (1821) 163 t. 15. — Graminea, saepius graciliter plumosa, super basin longe ramosa, caules ad bipedales, ramulis brevibus dense foliatis; folia anguste linearia, 1,5—2,5 cm longa, utrinque spinulis minutis numerosis (30—50) ascendentibus instructa; vagina longe auriculata. Semen anguste oblongum ad ellipsoideo-oblongum, 1,75—2,25 mm longum, areolis parvis subquadratis vel plurangulis numerosis subirregulariter sed saepius distincte lineatum (Fig. 5 *Q*—*V*).

Der Typus ist in der alten Welt weit verbreitet. Ich habe ihn gesehen von Algerien, Egypten, Nubien, Abyssinien, Ost-Afrika, Arabien, Syrien, Sokotra, Persien, Indien, Hinter-Indien, Java, Celebes, Amboina, Philippinen, Molukken, Hongkong, Japan, Neucaledonien, Australien. Er kommt auch in Nord-Italien vor, hier vielleicht eingeführt, außerdem in England nahe Manchester, an dieser Stelle sicher eingeführt. In pleistocenen Schichten von Sussex hat Reid einen Samen gefunden. Die Pflanze von Manchester ist den Pflanzen aus Egypten und Syrien im Blattbau ähnlich; Magnus betrachtet diese als eigene Varietät: Var. *Delilei*.

Var. *α*. **minor** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 426. — Minor, debilis; folia 7—16 mm longa; vagina brevius auriculata; semen 1,15—1,5 mm longum.

Ost-Indien und Hinter-Indien: Bengal (Griffith n. 5609/6), Burmah (Griffith), Pegu (Kurz nn. 3192, 3310).

Var. *β*. **angustifolia** Rendle in Trans. Linn. Soc. 2. Ser. V. (1899) 427 t. 42 fig. 202. — Debilis, folia angustiora (2—3 mm lata) apice subsetacea, denticulis marginalibus magis conspicuis. Semen vix 1 mm excedens (Fig. 5 *V*).

Singapore (Ridley n. 8946). — Borneo (Motley).

Species dubiae vel excludendae.

N. celebica Koorders in Mededeel. van's Lands Plantent. XIX. (1898) 270, 637. »Species valde incerta. Dioeca. Folia opposito-approximata, anguste linearia, spinulose dentata, 15 mm longa et 1 mm lata, basi subauriculato-dilatata; auriculis 2 acutis ciliolatis. Ovarii carpellum ellipsoideum, apice angustatum, stigmatibus subulatis 4—6«.

Celebes: Minahassa.

Nota. Species haud visa, numero stigmatum (4—6) cum genere vix congruens.

N. microphylla Reichb. Fl. germ. excurs. (1832) 843. — *Caulinia microphylla* Nocca et Balb. Fl. ticin. II. (1821) 163 t. 16. — Ni fallor, est *Ceratophyllum demersum* L.

N.? obvoluta Blanco, Fl. Filip. ed. 2. (1845) 460 est *Ceratopteris thalictroides* Brongn. vide op. cit. gran. ed. nov. App. (1880) 332.

N. palustris Blanco, Fl. Filip. (1837) 660. — *N. lobata* Blanco l. c. ed. 2. (1845) 459. — *N. tenuifolia* Naves et Vill. in Blanco, Fl. Filip. nov. App. (1880) 297 non R. Br. — Folia alterna, flores notabiles, fructus vesicaeformis cum genere haud congruunt.

N. rigida Griff. Notul. III. (1851) 181. — Folia carnosa rigida, alterna, interspatia concava; pistillum perianthio tubuloso apice spiculigero inclusum. Serampore. Pistillum ad *N. indicam* spectat sed nec folia carnosa, rigida, cum hac specie nec folia alterna cum genere congruunt.

Caulinia ?composita Buch.-Ham. ex Wall. Numer. List n. 5184 est *Ceratophyllum* sp.

Species fossiles.

Najas effugita Heer, Fl. tert. Helvet. I. (1854—1855) 103 t. 46 figg. 3*a* et 3*b*; Schimper u. Schenk, Handb. Paläont. II. (1890) 381; Rendle in Trans. Linn. Soc. 2. Ser. V. (1900) 444.

»N. fructibus minoribus lanceolatis, stylo brevissimo, stigmatibus duobus elongatis«.

Oeningen.

Nota. Specimen mihi non visum; forsan ex affinitate *N. marinae*?

N. striata Heer in K. Svensk. Vetensk.-Akad. Handl. VIII. no. 7. (1870) 52, t. 8 figg. 5, 6; Schimper u. Schenk l. c.; Rendle l. c.

»N. fructibus ovato-lanceolatis, longitudinaliter striatis, stylo longiusculo«.

Spitzbergen, Kingsbai.

Nota. Species mihi non visa ex iconibus ad genus *N.* pertinere non potest.

N. stylosa Heer, Fl. tert. Helvet. l. c. figg. 1, 2; Schimper u. Schenk l. c.; Rendle l. c.

»N. fructibus ovato-lanceolatis, stylo longiusculo, stigmatibus duobus elongatis.«

Oeningen.

Nota. Specimen mihi non visum; fig. 1 (ramus cum foliis) ad genus *N.* verosimiliter non pertinet, fructus (fig. 2) pro genere nimis magnus est.

Register

für Rendle-Najadaceae.

Die angenommene Gattung ist **fett** gedruckt, die angenommenen Arten sind mit einem Stern (*) bezeichnet.

Americanae Magnus (sect.) 10, 12.
Caulinia Willd. 6. (3).
alagnensis Pollini 18.
alternifolia Willd. 17.
composita Buch.-Ham. 19.
flexilis Willd. 12.
fragilis Willd. 14.
guadalupensis Spreng. 12.
indica Willd. 10.
intermedia Balbis 18.
microphylla Nocca et Balb. 18.
minor Coss. et Germ. 14.
muricata Spreng. 8.
pectinata Parl. 17.
tenella Nees 13.
Caulinia (Willd.) Aschers. (subg.) 7, 10.
Cavoliana Raf. 6.
Cavolinia Raf. 6.
Eunajas Aschers. (subg.) 7. (6).
Euvaginatae Magnus (sect.) 10, 14.
Fluvialis Adans. 6.
flexilis Pers. 12.
indica Pers. 10.
minor Pers. 14.
Fucus Tourn. 6.
Hyas Dumort. 7.
Ittnera C. C. Gmel. 7.
major Reichb. 7.
minor C. C. Gmel. 14.
najas C. C. Gmel. 7.
Najadaceae Magnus 1.
Najadeae Endl. 1.
Najades Juss. 1.
Najas L. 6.
*affinis Rendle 10, n. 5.
alagnensis Paglia 14, n. 16.
alagnensis Pollini 18, n. 32.
*ancistrocarpa A. Br. 11, n. 7. (10).
*arguta H. B. K. 13, n. 12. (11 Fig. 4, 12).
arguta var. conferta A. Br. 13, n. 15.
arguta var. tenera A. Br. 13, n. 12.
*australis Bory 17, n. 28. (14, 16 Fig. 5).
*brevistyla Rendle 16, n. 24. (11 Fig. 4, 14).
*Browniana Rendle 17, n. 26. (14, 16 Fig. 5).
canadensis Michx. 12, n. 8.
celebica Koorders 18.
*conferta A. Br. 13, n. 15. (11 Fig. 4, 12).
dichotoma Roxb. 14, n. 16.
effugita Heer 19. (6).
*falciculata A. Br. 15, n. 23. (14).
flexilis Griseb. 12, n. 10; 13, n. 14.
flexilis (Willd.) Rostkovius et Schmidt 12, n. 8. (2 Fig. 1, 5, 6, 11 Fig. 4).
var. microcarpa Nilsson 12, n. 8.
var. robusta Morong 12, n. 8.
flexilis var. curassavica A. Br. 13, n. 10.
flexilis var. fusiformis Chapm. 12, n. 10.
flexilis var. Gollmeriana A. Br. 13, n. 11.
flexilis var. guadalupensis A. Br. 12, n. 10.
flexilis var. punctata A. Br. 13, n. 11.
fluvialis Thuillier 7, n. 1.
fluviatilis Poir. 7, n. 1.
*foveolata A. Br. 15, n. 22. (11 Fig. 4, 14).
var. minor Rendle 15, n. 22.
fragilis Del. 14, n. 16.
fucoides Griff. 7, n. 1.
*gracillima (A. Br.) Magnus 15, n. 19. (14, 16 Fig. 5).
*graminea Del. 18, n. 32. (3, 5, 6, 16 Fig. 5).
var. angustifolia Rendle 18, n. 32.
var. Delilei Magnus 18, n. 32.
var. minor Rendle 18, n. 32.
graminea var. tenuifolia A. Br. 17, n. 25.
guadalupensis Morong 12, n. 10.
heteromorpha Griff. 14, n. 16.
*horrida A. Br. 17, n. 30. (3 Fig. 2, 14, 16 Fig. 5).
*indica (Willd.) Cham. 10, n. 2. (3, 4, 9 Fig. 3).
indica Zoll. 15, n. 22.
indica var. gracillima A. Br. 15.
intermedia Gorski 8, n. 1.
*interrupta K. Schum. 17, n. 31. (14).
*Kingii Rendle 15, n. 20. (14, 16 Fig. 5).
*Kurziana Rendle 15, n. 17. (11 Fig. 4, 14).
*lacerata Rendle 15, n. 21. (3, 14, 16 Fig. 5).
latifolia A. Br. 8, n. 1.
latior Muell. 7, n. 1.
*Leichhardtii Magnus 17, n. 27. (14).
lobata Blanco 18.
*madagascariensis Rendle 10, n. 6. (11 Fig. 4).
major Allion. 7, n. 1.
major var. laevis DC. 7, n. 1.
*marina L. 7, n. 1. (2 Fig. 1, 3, 5, 6, 9 Fig. 3).
var. angustifolia A. Br. 8, n. 1.
var. angustissima K. Schum. 9, n. 1.
var. brachycarpa Trautv. 8, n. 1.
var. brevifolia Rendle 8, n. 1.
var. californica Rendle 9, n. 1.
var. denticulata Rendle 7, n. 1.
var. Ehrenbergii A. Br. 8, n. 1.
var. gracilis Morong 9, n. 1.
var. grosse-dentata Rendle 8, n. 1.
var. intermedia (Gorski) A. Br. 8, n. 1.
var. latifolia A. Br. 8, n. 1.

var. mexicana Rendle 9, n. 1.
var. microcarpa A. Br. 8, n. 1.
var. muricata (Del.) A. Br. 8, n. 1.
var. recurvata Dudley 8, n. 1.
var. Riedelii K. Schum. 8, n. 1.
var. Zollingeri Rendle 7, n. 1.
marina L. p. p. 14, n. 16.
maritima Pall. 8, n. 1.
*microcarpa K. Schum. 13, n. 13. (12).
*microdon A. Br. 12, n. 10. (5, 6, 11 Fig. 4).
microdon var. curassavica A. Br. 13, n. 10.
microphylla Reichb. 18.
*minor Allione 14, n. 16. (2 Fig. 1, 5, 6, 11 Fig. 4).
var. intermedia Cesati 14, n. 16.
var. spinosa Rendle 15, n. 16.
minor var. indica A. Br. 10, n. 2; 17, n. 28.
minor var. setacea A. Br. 17, n. 29.
minor var. tenuissima A. Br. 15, n. 18.
monosperma Willd. 7, n. 1.
muricata Del. 8, n. 1.
muricata Thuillier 7, n. 1.
obvoluta Blanco 18.
palustris Blanco 18.
pectinata Magnus 17, n. 30.
*podostemon Magnus 12, n. 9. (5).
polonica Zalewski 7, n. 1.
*punctata (A. Br.) Rendle 13, n. 11. (11 Fig. 4, 12).
rigida Griff. 19.
*Schweinfurthii Magnus 10, n. 3. (11 Fig. 4).
seminuda Griff. 18, n. 32.
serristipula Maxim. 18, n. 32.
*setacea (A. Br.) Rendle 17, n. 29. (16 Fig. 5).
striata Heer 19. (6).
stylosa Heer 19. (6).
subulata Thuillier 14, n. 16.
tenera Schrad. 13, n. 12.
tenuifolia Aschers. 18, n. 32.
tenuifolia Naves et Vill. 18.
*tenuifolia R. Br. 17, n. 25. (14, 16 Fig. 5).
tenuis A. Br. 10, n. 2.
*tenuissima A. Br. 15, n. 18. (5. 14).
ternata Roxb. 14, n. 16.
tetrasperma Willd. 7, n. 1.
valisnerioides Griff. 18, n. 32.
*Welwitschii Rendle 10, n. 4. (11 Fig. 4).
*Wrightiana A. Br. 13, n. 14 (11 Fig. 4, 12).
var. laxa A. Br. 13.
Nudae Rendle (sect.) 10, 18.
Sclerocarpus obliquus C. A. Weber 7.
Spathaceae Rendle (sect.) 10.

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